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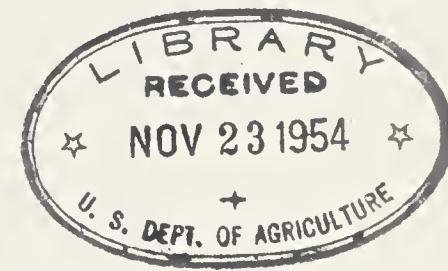
Rural Electrification Administration  
Telephone Operations Manual

Section 1374  
Issue No. 1, August 1954

SELECTING AND MAINTAINING VEHICLES,  
TOOLS, AND OTHER WORK EQUIPMENT

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1. GENERAL

- 1.1 The purpose of this section is to present to REA borrowers a discussion on selection of appropriate vehicles and work equipment, and suggest procedures for their maintenance.
- 1.2 One of the major responsibilities of a manager is selection of vehicles and work equipment best suited to accomplish the job required at a minimum of investment and expense.
- 1.3 This section deals with vehicles and other work equipment commonly used by an average REA-type borrower to operate a telephone system. It is realized that certain vehicles and work equipment not covered by this section may be required in some systems, and selection thereof should be based on economic considerations applicable in each particular instance.

2. SELECTION OF PROPER VEHICLE

- 2.1 Management, in selecting a vehicle for a system, should give consideration to the miles of plant to be maintained, number of subscribers to be served, condition of roads, terrain under lines, the type of work to be done, and type and amount of equipment to be carried on the vehicle.
- 2.2 The manager of a small system which has one or even two exchange areas and few foreseeable plant extensions should give consideration to obtaining a light weight installer-repairman vehicle in the one-half ton class. This vehicle, being light will permit the installer-repairman to service more plant and station facilities and with less expense.

than will the heavier three-quarter ton vehicle. When the system has two or more exchange areas and these exchange areas are widely separated, the manager might consider use of a second one-half ton installation vehicle. Care should be exercised to prevent overloading as there is a tendency to carry an excess of materials, supplies and tools to the extent that life of the vehicles is shortened. This is particularly true with regard to tires.

- 2.3 When considerable plant extension is contemplated and it is intended to use one vehicle for installation, maintenance and light construction work, the manager should consider the three-quarter ton all purpose vehicle. This vehicle should have an "A" frame of detachable type with a winch mounted on the vehicle and should be capable of handling poles up to 35 feet in the lighter classes and moving heavy equipment as may be necessary from time to time. This vehicle should also have a two section extension ladder for doing work on or around wire and cable leads as in tree trimming, splicing in a span, attaching drops to and running wire on buildings, and repairing lead covered cable. This ladder should be mounted on the vehicle and arranged so as to be readily detachable when necessary. Road conditions and general terrain might be such as to require that the vehicle be equipped with a four speed transmission which would increase the life of the vehicle.
- 2.4 Some few systems will be large enough to justify an installer-repairman vehicle and a light construction truck. For systems of this size, thought should be given to the type and amount of equipment to be carried by the truck and the number of men it will accommodate. When the manager can foresee a large amount of plant extension work in addition to normal servicing of the plant it might be well to consider a one ton light construction truck. If only a moderate amount of plant extension work is planned then the three-quarter ton vehicle would probably suffice as it will accomodate light construction equipment necessary for pole setting and wire stringing. The installer-repairman vehicle would be used only for station installation and trouble shooting.
- 2.5 There are many practical methods of determining the number of vehicles required and there are several basic factors to be considered in such a determination. The following discussion will attempt to demonstrate a method using several basic factors and an assumed set of circumstances to determine what vehicles would be required by this hypothetical system. This system is located in open country with only a moderate amount of woods and underbrush

to be considered and has only one exchange area. Roads are in fair condition and the system is, generally speaking, built along the road net. The average subscriber circuit is 5 miles in length. This system consists mostly of new construction and the balance is, in general, in good condition. For this example, it is assumed that work required for new station installations will be balanced out by the reduced preventive maintenance required during the first few years of operation and therefore no mention is made of station installations, moves and changes. This system is predominantly rural in its makeup.

#### EXAMPLE

a. Miles of pole line . . . . .	400
b. Number of subscribers . . . . .	1400
c. Average length of subscriber circuit . . . . .	5 miles
d. Average travel distance per case of trouble. . . . .	10 miles
e. Average number of trouble cases per 100 subscribers per month. . . . .	5
f. Tree trimming and miscellaneous preventive maintenance per mile of pole line per year . . . . .	1 hour
g. Tree trimming and miscellaneous preventive maintenance per station drop per year. . . . .	1/4 hour
h. 10 miles driving time per case of trouble. . . . .	40 minutes
i. Labor time per case of trouble . . . . .	30 minutes
j. Work days per year . . . . .	260
k. Work days per month. . . . .	21.7

#### SOLUTION:

$$(a \times f) \div j = 1.5 \text{ hours daily}$$

$$(b \times g) \div j = 1.3 \text{ hours daily}$$

$$(e \times b \times i) \div j = 1.6 \text{ hours daily}$$

$$(e \times b \times h) \div j = \underline{2.1} \text{ hours daily}$$

6.5 hours daily workload

Vehicle requirements for this system would be one vehicle. Some of the above factors will be variable and each borrower will have to determine the proper value to fit his particular

system. The figure of 5 cases of trouble per 100 stations per month is generally considered to be representative for rural type systems enjoying a "good" grade of service and plant maintenance. The factor of 1 hour per mile of pole line per year for tree trimming and preventive maintenance is a conservative figure for the conditions outlined above. The time for clearing a case of trouble assumed here as 30 minutes is on the liberal side and the manager might wish to reduce this figure after due consideration. When the system is composed of more than one exchange area, it is necessary that consideration be given to driving time required between exchange areas. It is the intent here merely to illustrate the use of several of the basic factors in determining daily usage of a work vehicle and hence, logically, the number of vehicles required.

### 3. SELECTION OF APPROPRIATE UTILITY BODY

- 3.1 There are several types of utility bodies available that are suitable for installation, repair and maintenance work. These bodies may be purchased with various arrangements of compartments. The general types of bodies referred to are shown on Exhibits A, B and C, attached.
- 3.2 Exhibit A illustrates a standard one-half ton general service body of the panel type. This body is equipped with panel door openings on side compartments with bar-locks for protection of compartment contents. This body may be equipped with a sliding steel roof or a tarpaulin roof enclosure to protect the contents of the bed against the elements.
- 3.3 Exhibit A, figures 1 and 2, illustrates a light one-half ton installation body which has found wide application in the larger telephone companies. Its best service will be realized where its use is confined solely to station installation and maintenance. This body has several trays of various depths and widths and material drawers having flexible compartments with movable partitions.
- 3.4 Exhibit B, figures 3 and 4, illustrates a one-half ton standard pickup body with side boxes attached. These side-boxes are manufactured in several sizes. Four standard sizes and their arrangements will be found in figure 4, A, B, C and D. The compartment arrangements are flexible and may be purchased in any desired combination.
- 3.5 Exhibit C, figures 5 and 6, illustrates a three-quarter ton all purpose body which is a combination of an installation and light construction body. This unit has most features

of the installation body as well as mountings for equipment to be used in light construction work. The compartment arrangement for this unit is similar in most respects to the unit referred to in 3.2 above.

- 3.6 A check list of tools to be carried on an installer-repairman vehicle is attached as Exhibit D. This list is not to be considered all inclusive and items should be added as necessary.

#### 4. MAINTENANCE OF VEHICLE

- 4.1 Proper care and maintenance of vehicles will reduce the operating cost and materially extend the life of the vehicles. This care, as reflected in the appearance of the vehicles, will do much to improve the company's relations with the public.
- 4.2 Vehicles should be given regular inspections by the driver and should include a check of the foot and hand brakes, lights, horn, windshield, windshield wipers, defrosters, tires, wheels, exhaust pipe and muffler, winch, and the engine for cleanliness and defective parts. Such personal maintenance attention will effect major savings in time and money by effecting minor repairs in time to prevent major breakdowns.
- 4.3 Vehicles should be given periodic general inspections by qualified mechanics at a location where necessary lifts and other special equipment are available. Frequency of such inspections will be determined by the age and type of vehicle, miles traveled, and the general condition of vehicle. The management should be advised by a competent garage as to the frequency of such general inspections. A check list is attached as Exhibit E which lists common items that should receive attention in this inspection. This list is not all inclusive and items should be added as necessary.
- 4.4 One of the most important factors in keeping vehicles in a usable condition is the care exercised in their operation. The manager should give consideration to this factor, also, from the standpoint of adverse public reaction created by reckless and inconsiderate drivers.

#### 5. WORK EQUIPMENT

- 5.1 This category would commonly include such items as mechanical hole diggers, portable emergency power units, portable generators for power tools or lighting, cable spinning equipment and other similar equipment of comparatively long life.

- 5.2 Much thought should be given by management to the specific requirement for and feasibility of purchasing any of the above items. It is extremely difficult for many smaller companies to justify the purchase of special work equipment. Before such a purchase is made, management should attempt to determine the amount of work such equipment would be required to perform annually and weigh this cost against the cost of doing the same job by other methods.
- 5.3 When portable work equipment can be fitted into suitable carrying cases, life of the equipment will be greatly extended. This would apply especially to cable spinning equipment, electric drills, strand gauge meters and similar items of work equipment.
- 5.4 All work equipment should be properly cleaned and cared for in accordance with instructions of the manufacturer. Equipment should be stored in a dry place during periods when not in use.

## 6. SAFETY

- 6.1 It is the responsibility of a manager to ascertain that each operator of a company-owned vehicle is familiar with and observes all safety codes, the requirements of state motor vehicle codes, and municipal and local traffic regulations.
- 6.2 The manager should insist that all vehicle operators be familiar with and abide by standard "Safety Practices".

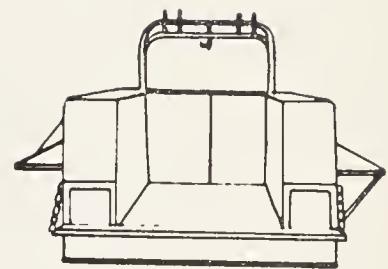
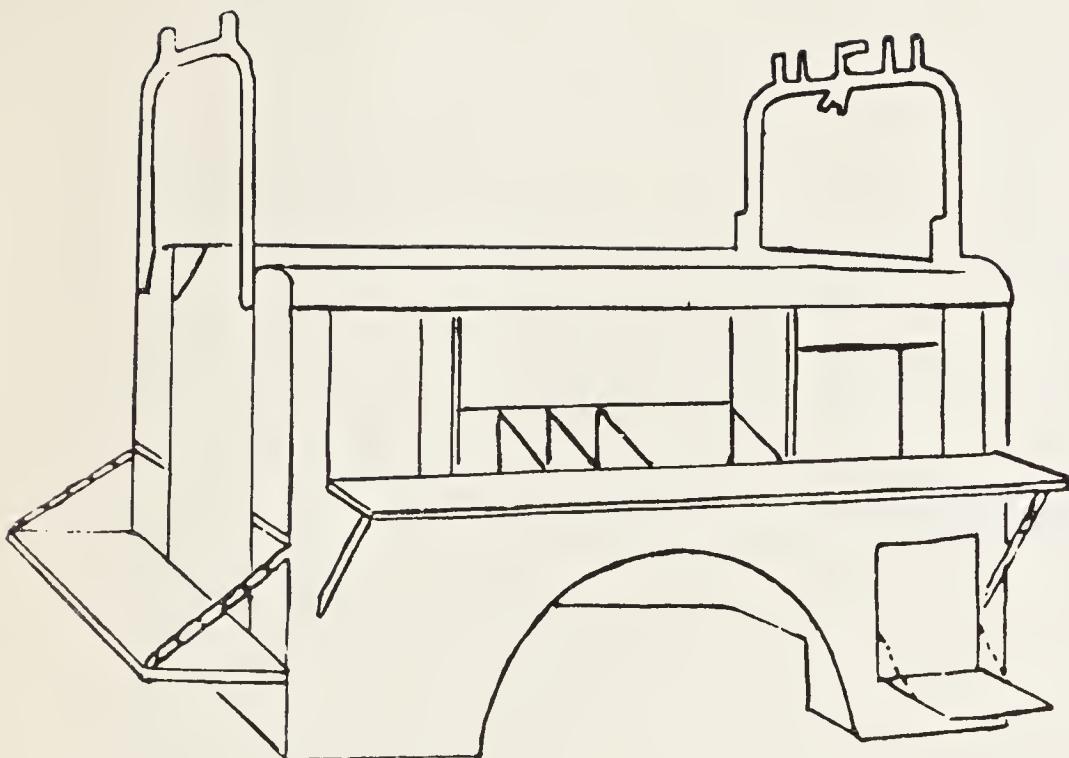


Fig. 1

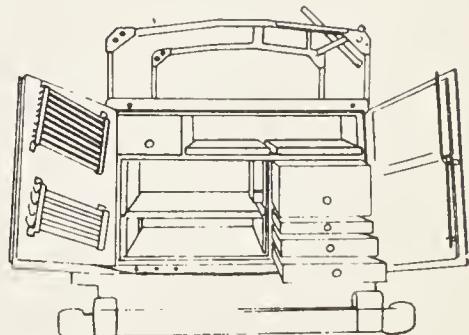
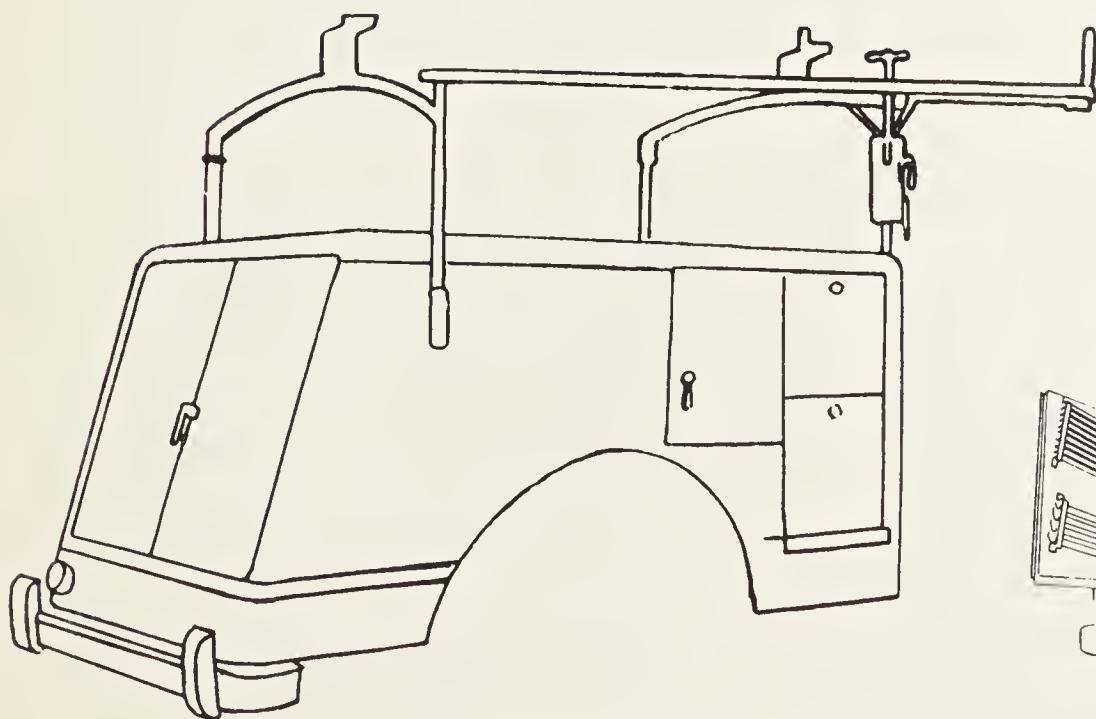


Fig. 2



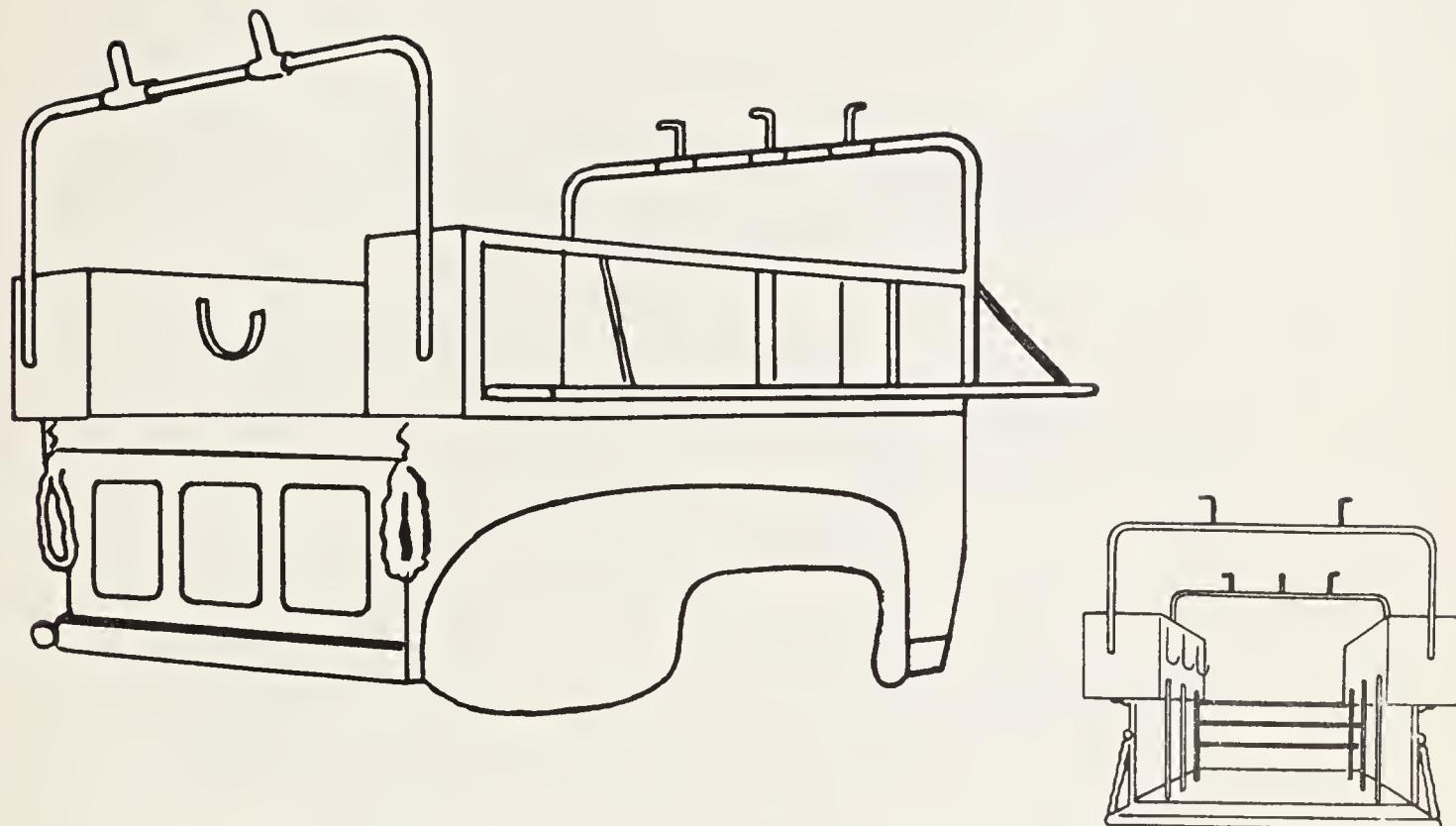


Fig. 3

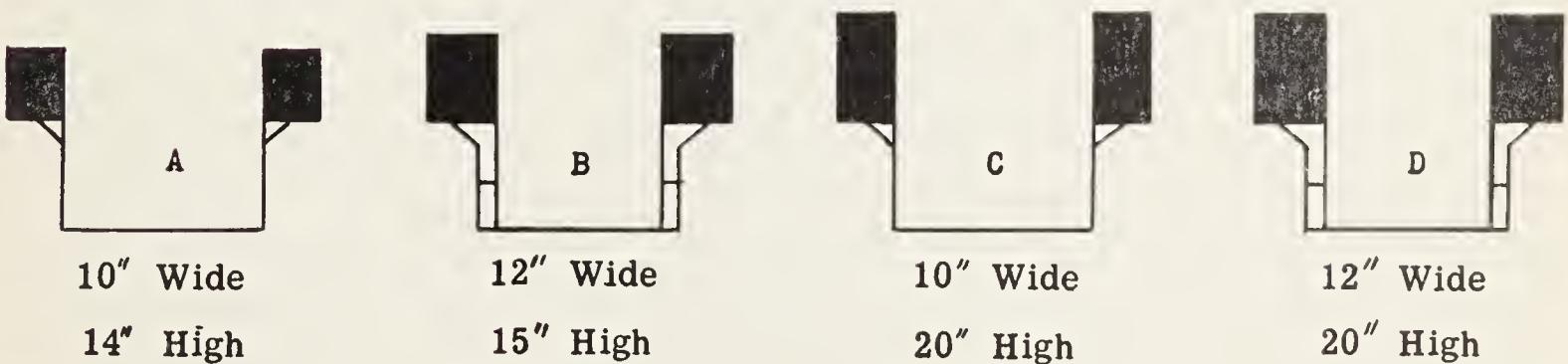


Fig. 4

\* Above dimensions are approximate.

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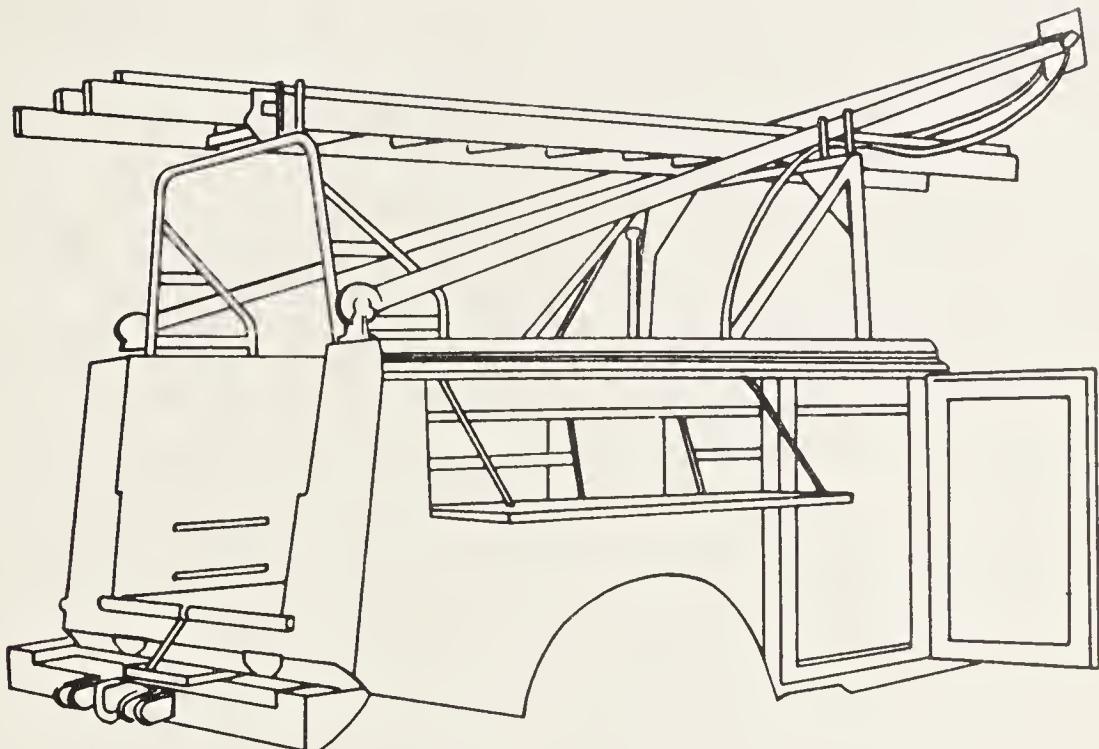


Fig. 5

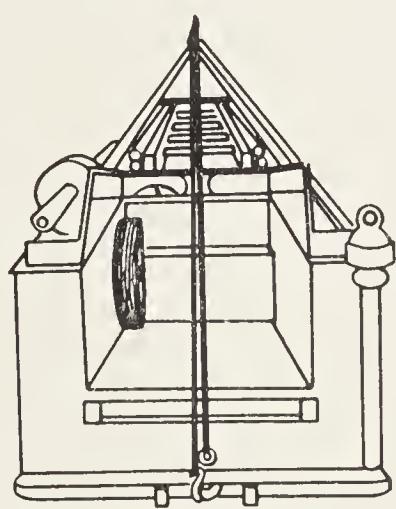


Fig. 6

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A Check List for Vehicle Inspection

1. Lubricate chassis
2. Check oil for filter cartridge change
3. Check level of motor oil
4. Check level of oil in transmission
5. Check level of grease in differential
6. Tighten radiator to chassis
7. Adjust fanbelt
8. Tighten hose connections
9. Clean air cleaner
10. Adjust carburetor
11. Clear fuel pump and filter bowl
12. Adjust generator charging rate
13. Check and adjust distributor points
14. Check and adjust spark plugs
15. Check battery, clean terminals, add water as required
16. Grease front wheel bearings
17. Adjust service brakes
18. Adjust hand brake and check ratchet and pawl
19. Adjust clutch pedal travel
20. Check valve adjustment (overhead only)
21. Check lighting system
22. Check and adjust horn
23. Check and adjust windshield wipers
24. Check condition of window regulators and door handles
25. Check windshield and door glass
26. Check rear view mirror
27. Check condition of tires and inflate, when necessary
28. Check wheel nuts
29. Straighten small fender dents
30. Wash vehicle each week
31. Polish monthly

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Tool List for Station Installer - Troubлемan (Typical)

1. Belt, Body, Linemen's with Safety Belt
2. Climbers, Linemen's
3. Bit, Bellhanger 3/8 x 24"
4. Blade, Hacksaw
5. Brace, Ratchet 10" Sweep
6. Burnisher, Contact
7. Chisel, Wood, 3/4"
8. Clamp, Splicing
9. Drill, Automatic
10. Drill, Masonry (Short) 1/4" Diameter
11. Drill, Masonry (Short) 5/16" Diameter
12. Drill, Rock, Star Point, Diamond, 5/8 x 12"
13. Drill Point, Automatic, 5/64"
14. Drill Point, Automatic, 3/32"
15. Drill Point, Automatic, 1/8"
16. Drill Point, Automatic, 11/64"
17. File, Flat, Smooth, 8"
18. File, Half-round, 3"
19. Flashlight, Right-angle
20. Frame, Hacksaw
21. Gloves, Rubber, Electricians
22. Hammer, Drilling
23. Hammer, Riveting, 7 Ounce
24. Handline, 3/6"
25. Holder, Drill, Type C
26. Knife, Electricians
27. Pliers, Side Cutting 6"
28. Pliers, Long Nose
29. Rule, Measuring, Folding 6'
30. Saw, Compass 12 inch, 8 point
31. Screwdriver, Cabinet, 3"
32. Screwdriver, Cabinet, 7"
33. Screwdriver, 4"
34. Screwdriver, 5"
35. Screwdriver, 8"
36. Test Set (Dial or Manual)
37. Tool, Wire Braid Stripper
38. Tool, Double End Socket and Screwdriver
39. Tool, Crimping.



Tool List for Cable Splicer (Typical)

1. Belt, Lineman's Safety
2. Belt, Lineman's Tool
3. Bits, Wood (as Required)
4. Blades, Hacksaw (Assorted)
5. Block, Handline
6. Blowtorch (1 Quart)
7. Boards, Tag (as Required)
8. Brace, Ratchet (10" Sweep)
9. Car, Cable
10. Clamps, Lashing Wire
11. Climbers, Lineman's (With Pads and Straps)
12. Cloths, Wiping (Assorted)
13. Copper, Soldering (1 Pound)
14. Dipper, Paraffin
15. Dresser, Hardwood
16. File, Mill, Flat (12")
17. Frame, Hacksaw
18. Furnace, Gasoline or Kerosene (1 Gallon)
19. Hammer, Straight Claw
20. Handline (Approximately 75' 3/8" Manila)
21. Headsets, Test (Dial or Manual), two (2)
22. Hook, Shave
23. Iron, Soldering (5/8" 200 Watt)
24. Kit, First Aid
25. Knife, Electricians
26. Knife, Sheath Splitting
27. Ladder (40' Extended)
28. Ladle, Metal
29. Pan, Catch, Paraffin
30. Pick, Test, Needlepoint
31. Platform, Splicers
32. Pliers, Long Nose, 5"
33. Pliers, Oblique Cutting, 5"
34. Pliers, Side Cutting, 8"
35. Pot, Melting, Paraffin
36. Pot, Melting, Metal (50 lbs.)
37. Puller, Slack
38. Rasp, Splicers (10" x 1")
39. Rule, Folding (6 ft.)
40. Saw, Cableman's (16")
41. Scissors, Electricians
42. Screwdriver (3/8" x 8" blade)
43. Screwdriver (7/32" x 3" blade)
44. Snips, Tinner's (12")
45. Thermometer
46. Tent, Aerial, Splicer's
47. Tester and Locater, Cable
48. Windshield, Folding
49. Wrench, Pipe (12")
50. Wrench, Crescent (8")
51. Wrench, Crescent (12")
52. Wrench, Terminal

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